PR-33. SYNTHESIS, CRYSTAL STRUCTURE AND PROPERTIES OF $ND_{1-x}A_xMNO_{3-\Delta}$ (A = BA, SR AND CA)

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Abstract

Rare-earth manganites have been extensively studied due to their promising physicochemical properties [1, 2]. In this work, the effect of A-site substitution by different alkaline earth metals on properties of $NdMnO_{3-\delta}$ have been investigated. The samples have been synthesized by a citrate-nitrate combustion technique followed by the calcination of the as-prepared powders at 1100 °C in air. Then, the powders were pressed into pellets and sintered at 1350 °C for 20 h in air. The samples were characterized by X-ray powder diffraction (XRPD), thermo-gravimetric analysis and the standard 4-probe DC technique in the temperature range of 25–1000 °C in air. The XRPD patterns revealed that all samples were single-phase and possessed an orthorhombic structure (*Pnma* space group). The Rietveld refinement of the patterns showed that the unit cell volume reduced with a decrease in dopant size. The temperature dependences of oxygen non-stoichiometry indicated that oxygen release from the samples started only at temperatures above 600 °C. The total conductivity of the samples possessed semiconducting behaviour in the whole temperature range studied. The highest value of total conductivity (206 S/cm) was observed for the Ba-doped sample at 1000 °C.

References

1. Oxygen Nonstoichiometry and Crystal and Defect Structure of $PrMnO_{3+y}$ and $NdMnO_{3+y}$ / V. A. Cherepanov [et al.] // J. of Physics and Chemistry of Solids. 1994. Vol. 55. P. 229–235.

2. A-site substitution effect on crystal structure and properties of $Nd_{1-x}A_xMn_{0,5}Fe_{0,5}O_{3-\delta}$ (A = Ca, Sr, Ba; x = 0, 0,25) / A. R Gilev [et al.] // Solid State Ionics. 2018. Vol. 323. P. 64–71.